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Does the DMN Predict Differences in Anticipatory and Consummatory Pleasure?

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Introduction

- Lack of social pleasure is commonly observed in psychopathology, but its etiology remains unknown.
- Though extant studies have connected anhedonia to anticipatory pleasure deficits[1], little is known about the neural basis of these deficits, besides those localized to the reward system.
- Further, the default mode network (DMN), a system of brain regions that increase in activation when the mind is at rest, has been speculated to play a role in prospection[2], a skill necessary when making predictions about the level of pleasure experienced during future social interactions.
- Thus, we investigated whether functional connectivity in the DMN explains individual differences in anticipatory and consummatory social pleasure, and social affective forecasting[3].

Methods

- 22 healthy adults (36.2 ± 15.9 years, 16 F, 6 M) underwent 3-Tesla fMRI scanning while at rest.
- Functional connectivity (mean ROI-to-ROI correlations) within the **core network** (aMPFC, PCC), the **dmPFC subsystem** (dmPFC, TPJ, LTC, TempP), and the **MTL subsystem** (HF, PHC, Rsp, vMPFC, pIPL) [4] were calculated using *Conn*.
- Social pleasure (anticipated/consummatory) were measured outside of the scanner using the Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS).
- Participants completed 8 day daily diary entries, indicating anticipatory feelings for future social interactions, and after the interactions, consummatory feelings for those same interactions. Social affective forecasting was calculated as the absolute difference between those ratings (lower score = higher social affective forecasting accuracy).

Specific Components of the DMN, namely the MTL subsystem, are related to social affective forecasting

Figure 1. (a, b, and c). Scatter plots of the significant relationships between the MTL subsystem and overall, positive emotion, and negative emotion affective forecasting accuracy

(a).

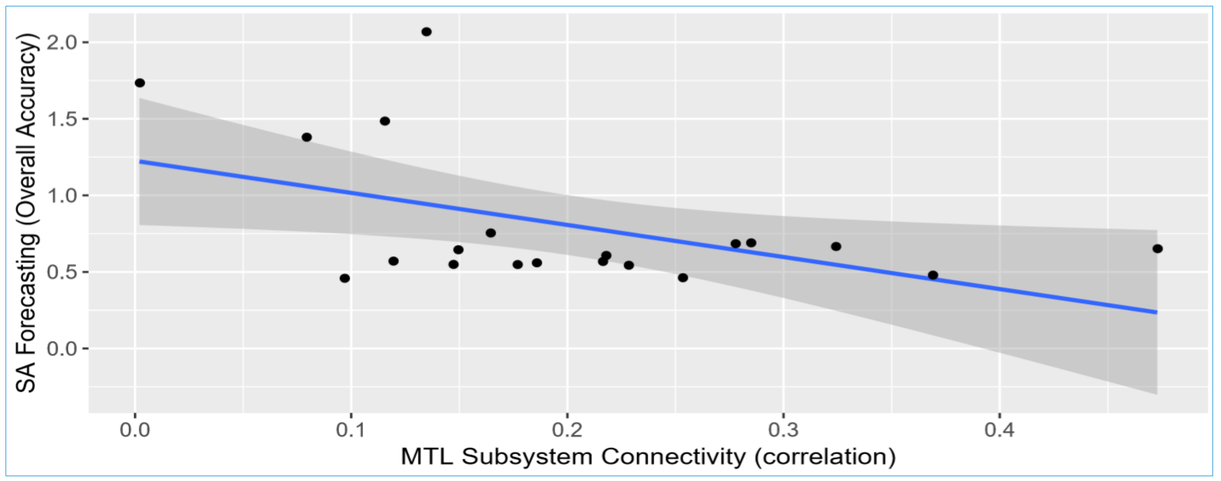

Figure 1a. demonstrates a significant negative relationships between the MTL subsystem and overall emotion social affective forecasting accuracy (r=.-49, p=.03, 95% CI [-.77, -.06])

(b).

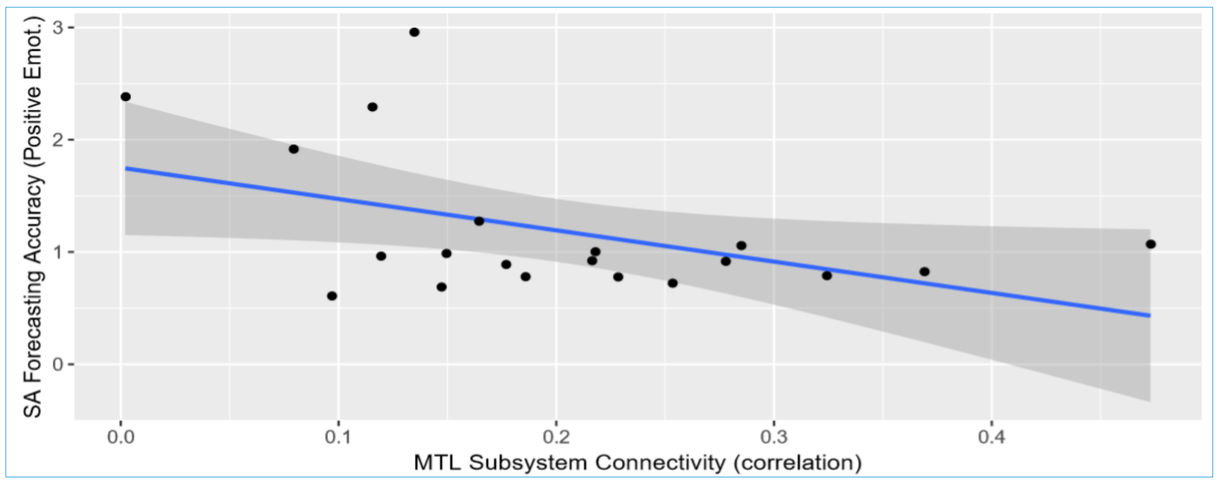

Figure 1b. demonstrates a significant negative relationships between the MTL subsystem and (positive emotion) social affective forecasting accuracy (r=.-46, p=.04, 95% CI [-.75, -.03])

(c).

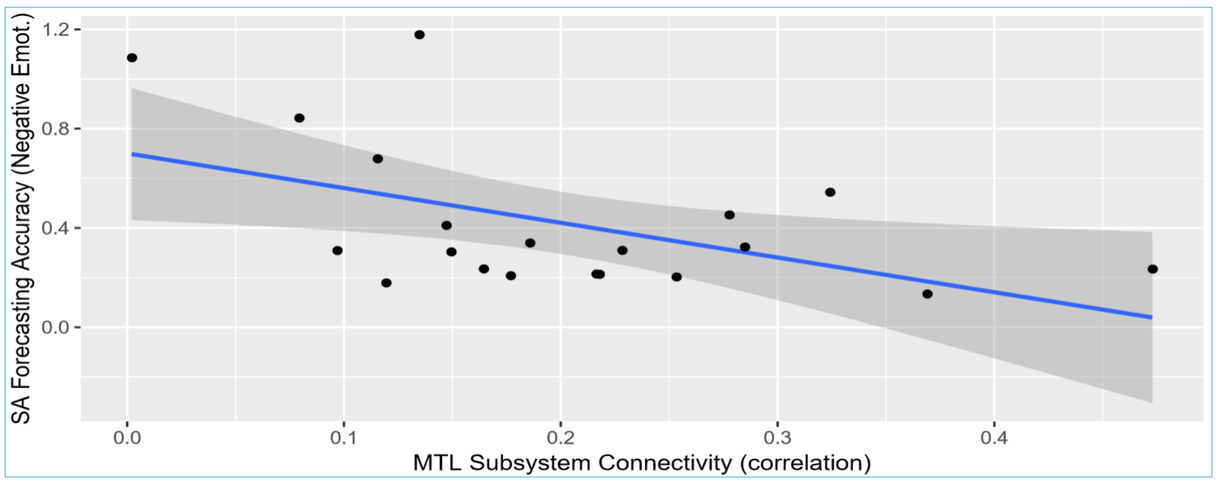

Figure 1c. demonstrates a significant negative relationships between the MTL subsystem and (negative emotion) social affective forecasting accuracy (r =-.51, p=.02, 95% CI [-.78, -.08])

Results

- Linear regressions indicated significant negative relationships between the MTL subsystem and negative, positive, and overall emotion forecasting accuracy during social interactions (Figure 1).
- No significant relationships were found between the DMN subsystems and the ACIPS.

Conclusions

- Functional connectivity in the MTL subsystem of the DMN is associated with social affective forecasting accuracy of negative, positive, and overall emotions experienced during social interactions.
- Taken together, the MTL subsystem may play a role in social anhedonia and could serve as a neurobiological target for alleviating the affective forecasting deficits that are observed in schizophrenia and depression.

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